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WHEAT AND FLOUR PRIMER

WASHBURN-CROSBY CO.

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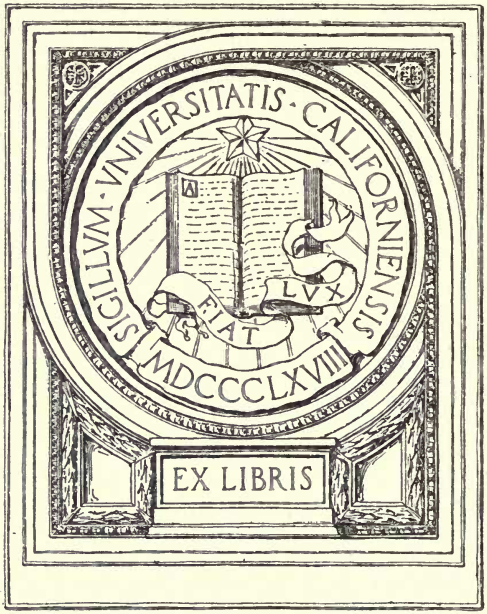
GIFT OF
Washburn Crosby Co.



WHEAT AND FLOUR PRIMER

Published by
WASHBURN-CROSBY CO.
MAKERS OF
GOLD MEDAL FLOUR

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TS 2149
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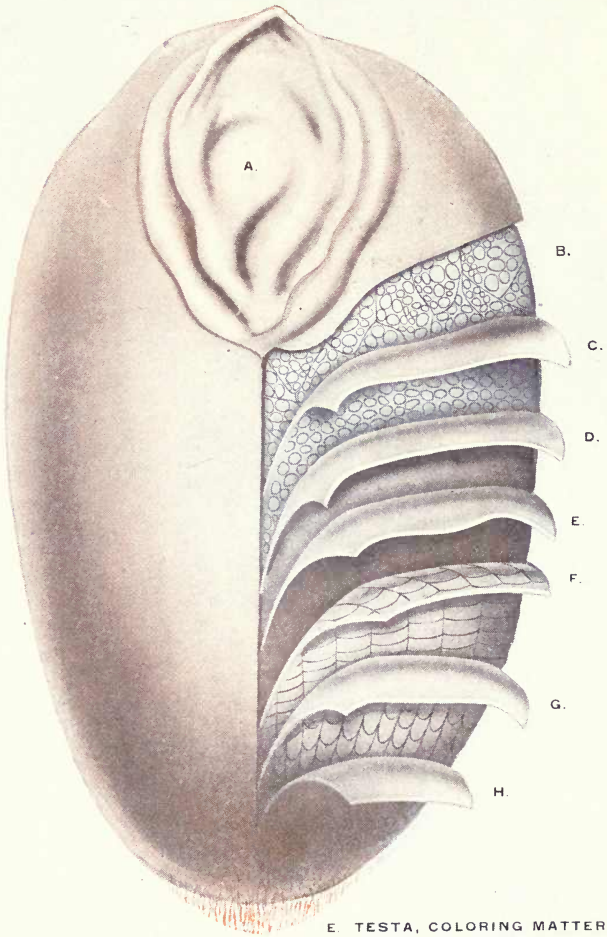
WASHBURN-CROSBY CO.

DISSECTED KERNEL OF WHEAT



A. GERM
B. GLUTEN CELLS PREDOMINATE
C. STARCH CELLS PREDOMINATE
D. INTERIOR COAT OF BRAN
E. TESTA, COLORING MATTER OF BRAN
F. ENDOCARP
G. EPICARP
H. EPIDERMIS

THE WHEAT

THE children of the United States cannot know too much concerning the staple product of the great Northwest, and the industry of flour making. These twin industries—wheat raising and flour making—give employment to many and varied classes of busy workers, from the time of planting the seed grain in the rich, deep loam of prairie soil, in the spring, till the flour is loaded into cars as the finished product of the mills.

Picture the long and varied processions of workers. There are the machinists and tool makers, the farmers, horses and blacksmiths, railroad operators, car builders and elevator men, the millwrights, engineers and millers, the chemists, bag makers, coopers and capitalists, the firemen, porters and teamsters who swell the long list of those who find investment for their capital or employment for brain or muscle in the wheat industry.

In Minnesota and the Dakotas wheat is sown on fall-plowed land as early in the Spring as the season will permit, often before the last calls of Jack Frost have been made, since it is a hardy grain and can endure cold.

The farmer does not scatter his seed by hand from a basket on his arm, as we see the sower who went forth to sow in the old Bible pictures. Instead, he sits comfortably upon the seeder—a large machine drawn by horses. This has a seed

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box with capacity of several bushels, from which, as the seeder moves, the grain drops evenly upon the plowed and harrowed soil.

Within a few days, by the combined influence of warmth, moisture and sunlight, the tiny germ of life long hidden in the grain, begins its development, and soon appears above the soil in a spire of green, while rootlets at the same time fasten it to Mother Earth and hold it anchored there.

From April to August is its period of growth, and it fights against many foes before it becomes the fully ripened grain. Frost, hail and wind, an excess of drouth or of heat and moisture, all threaten its life or perfect development. Insects, chinch bugs and weevil, smut, mildew, and other forms of mold and fungus assail it; yet in spite of any and all these enemies sun and soil ripen the most magnificent crops of wheat grown anywhere in the world.

The hum of the reaper and binder is heard early in August and the grain, grown tall and yellow, is cut and bound in sheaves, in which form it awaits the threshers. Sometimes upon the smaller farms the wheat is stacked to protect it from rain, and it there awaits the work of the thresher; but on the large wheat farms it is threshed at once from the shocks.

The threshers, driven by horse or steam power, separate the kernels from the straw and so reduce the bulk of the crop as to prepare it for storage in the elevators, or to be at once transported to the mills and there prepared for food for both man and beast.

The provident farmer reserves the finest of his wheat for next year's seed, but this will be a mere fraction of the crop.

BIG RECEIVING ELEVATOR WASHBURN-CROSBY CO.

STORING THE WHEAT

All visitors to Minneapolis have seen the immense elevators of the Washburn-Crosby Co.—large, high buildings provided for the grading and storage of the wheat crop.

Let us follow a carload of wheat from the Red River Valley, where the finest northern wheat is grown, to the great Washburn-Crosby Mills where more than 100,000 bushels of grain may be consumed in one day in the manufacture of Gold Medal Flour, the standard brand of the world.

The cars run on tracks up to the doors of the immense receiving elevator where big power shovels scoop the grain up and drop it into a scale hopper from whence it goes to the concrete tanks later to be elevated and passed through the various processes which fit it for reduction to flour.

THE MILL

Weeds of many sorts have grown luxuriantly with the wheat and their seeds are mingled with the grain. To grind these with the wheat would change both the color and flavor of our wheaten bread.

The first task then is to separate the tare seeds and to clean the wheat. We shall use the old, familiar process of sifting and aeration. Many siftings and shakings will rid the wheat of all seeds smaller than itself. Drafts of air applied at different points and in varying directions blow away the chaff, bits of straw and the light-winged seeds, and a special process of separation takes out the troublesome cockle seed.

The machine for removing the cockle consists of an inclined metallic cylinder on the inside of which are small indentations just the size and form of the cockle seed. Running through

the center of this cylinder is a stationary apron. The wheat to be purified is fed into the revolving cylinder, the cockle falls into the indentations, is carried round with the cylinder until it gets above the apron when it falls by its own weight, is caught by the apron and thus separated from the wheat.

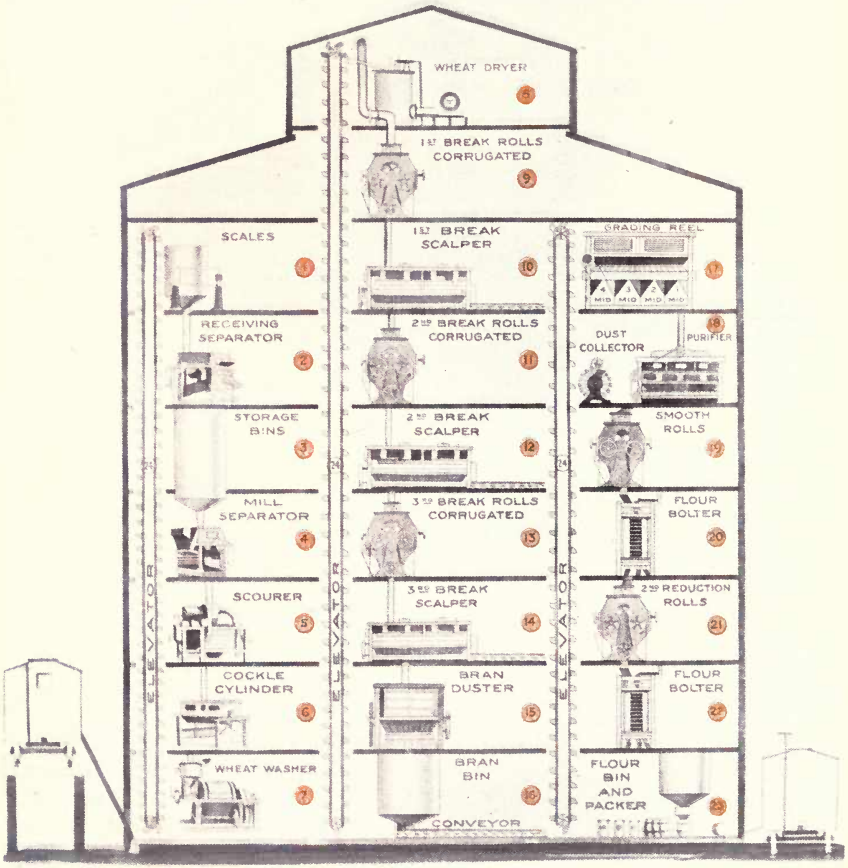
The wheat grains are then *scoured* clean and bright in a rapidly whirling cylinder, *brushed* still more furiously, moistened and washed, that the coats of bran may not be too easily powdered but may be separated in flakes.

Let us examine now our grain of wheat (see illustration). Under a powerful microscope we find its golden brown bran coats are five in number, which when analyzed show valuable cattle food properties and a small percentage of woody fibre. At one end we find it still shows a stiff bunch of bristling hairy fibres, its invisible *beard*, for to the eye it is clear and smooth. Within these bran coats there is a hard shell of glutenous matter yellow and half transparent, and of flinty hardness.

Inside this shell of gluten and merging therewith are starch cells, white as snow, resting within a net-work of the woody fibre, and we can easily find the germ—small, yellow as brown sugar, and both oily and sweet to the taste.

The process of milling is to remove the bran coats, separate the germ and crush gluten and starch to a powder of velvety softness.

From the top stories of the mill, where the cleansing processes have been perfected, the wheat, measured by the most perfect automatic device, which by the simple principle of gravity separates from the flowing stream of grain just enough for a barrel of flour (about five bushels), drops to the first floor of the mill where the rollers begin their work of crushing.



SECTIONAL VIEW OF A SIMPLIFIED FLOUR MILL

(1) Scales, for weighing wheat as it is received.
(2) Receiving separator, for separating other kinds of seeds from wheat.
(3) Storage bins, for reserve supply of wheat in advance of mill requirements.
(4) Mill separator, for further separating foreign seeds from wheat.
(5) Scourer, for removing dust from wheat kernels.
(6) Cockle cylinder, for removing all round seeds.
(7) Wheat washer, for thoroughly cleansing the wheat.
(8) Wheat dryer, for drying wheat after washing.
(9) 1st break rolls, for rupturing bran, enabling bran and germ to be separated from interior.
(10) 1st break scalper, for sifting middlings through bolting cloth to separate from bran.
(11) 2nd break rolls, for further loosening the middlings from bran.
(12) 2nd break scalper, for separating more middlings from bran.
(13) 3rd break rolls, for further loosening middlings from bran.
(14) 3rd break scalper, for final separation of middlings from bran.
(15) Bran duster, for dusting low grade flour from bran.
(16) Bran bin, for packing bran for shipment.
(17) Grading reel, for separating middlings by sifting through various sizes of bolting cloth.
(18) Dust collector and purifier, for cleaning and purifying middlings by air and sifting.
(19) Smooth rolls, for grinding purified middlings very fine to flour.
(20) Flour bolter, for sifting flour from purified middlings.
(21) 2nd reduction rolls, for further grinding of purified middlings.
(22) Flour bolter, for separating flour from purified middlings of second grading.
(23) Flour bin and packer, for packing flour for shipment.
(24) Elevator, for raising products to the various machines.

The early reductions serve to crush the grain slightly, remove much of the bran and bring the remainder, after several crushings, to the *granular* stage. At each reduction some starch cells are crushed and some flour produced, none of which is allowed to escape with the less valuable bran, but is bolted out and reserved for the various grades of flour.

Yards of the costly silk bolting cloth are used to separate the fine flour, and when we realize that it is made to pass through this silken fabric we no longer wonder at the velvety softness of Gold Medal Flour. Over and over the granular part is crushed and recrushed and the fine flour sifted out. Over and over the "middlings," as the sifted product of the rollers is called, are purified by siftings and aeration. At one period the germ, which, being easily flaked and not so readily pulverized is removed before the product reaches the flour stage. If ground with flour the germ would injure the color and affect its keeping qualities.

Finally, as a last precaution and in addition to all previous processes, the flour is again sifted through finest silk bolting cloth.

In these various reductions about 70 per cent of the grain is saved for food, and 30 per cent becomes bran and shorts.

The fine flour is at last dropped into a vertical chute and fills bags slipped over the cylinder of the packing machine at its lower end. The larger sacks are deftly secured by a few hand stitches across the top and at the ends, while the smaller sizes, which have of late become popular with housekeepers in large cities, are sewed by an automatic machine equipped with needle and twine very much as our home sewing machine is fitted with needle and thread.

In the preceding pages we have shown a sectional picture of a simplified flour mill. This was to assist in giving a connected idea of the milling process as briefly told without bringing in many confusing but nevertheless most important details.

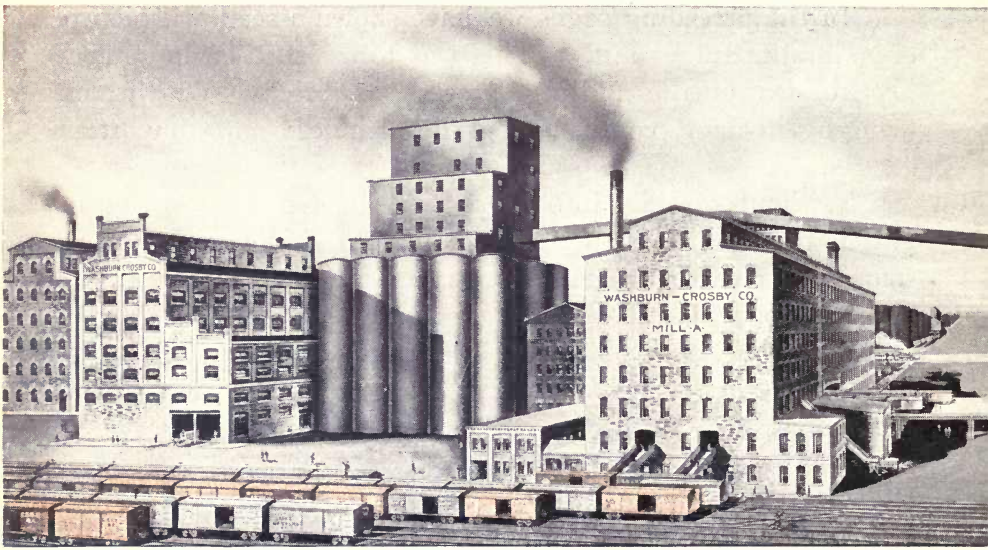
Without getting into these complicated matters let us pursue the milling feature a little further that we may learn some important facts concerning the size and capacity of the largest group of mills in the world, those of the Washburn-Crosby Co., where Gold Medal Flour is made.

The daily capacity of the Washburn-Crosby mills is 40,000 barrels. Each year the equivalent of all the wheat raised on 25,000 farms of 160 acres each is ground into flour. Every working day in the year more than 150 cars of wheat are consumed, and more than 150 cars of flour and feed are shipped to customers. More than 9,000,000 loaves of bread can be made daily from the product of these mills.

Washburn-Crobsy Co.'s experts have searched the world over for the latest and most improved methods, have studied scientific processes and applied this study and research to the construction and equipment of their enormous plant.

For a number of years a miniature flour mill with daily capacity of scarcely one barrel was operated in the Gold Medal Flour laboratory. This little mill proved itself a valuable adjunct to the testing facilities, enabling the company to grind into flour, samples of wheat offered in their market. Thus it could be ascertained before actually making purchase, whether or not the wheat offered was up to the Gold Medal standard.

The results obtained from the miniature testing mill were so satisfactory that it was decided to erect a six story building

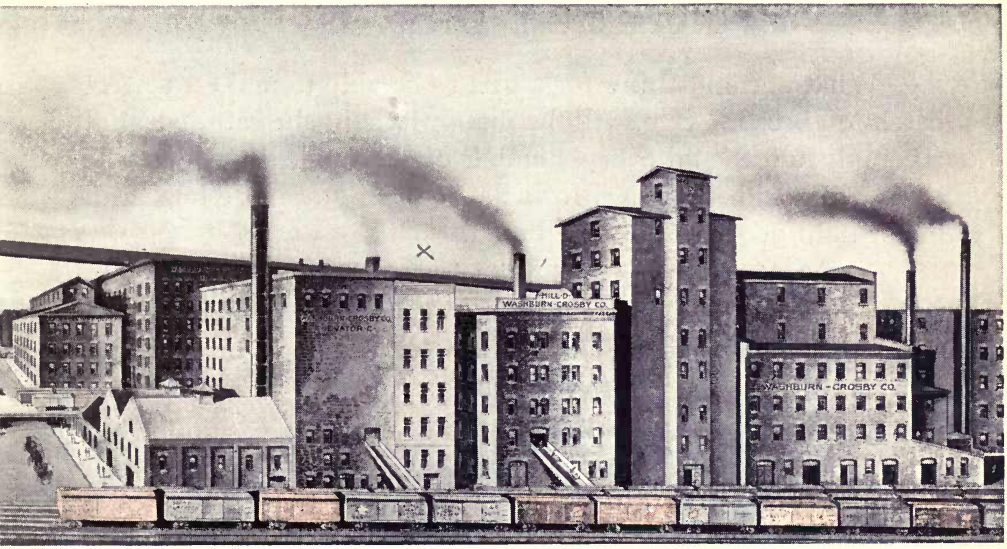


COMPOSITE PICTURE—WASHBURN-CROSBY CO.'S

(see X in picture) in the midst of the big plant to hold a new Experimental Mill of 600 barrels daily capacity.

If an inventor presents for sale a new machine which apparently has good points to assist in the manufacture of Gold Medal Flour, the machine is given a trial in the Experimental Mill where it is tested and tried from every standpoint before it is decided that it is good enough to have a place in the main system of the Washburn-Crosby mills. Thus the enormous capacity in the main plant is permitted to grind on uninterruptedly, using systems and processes which have been previously proven and thoroughly tried out.

The Washburn-Crosby Co. have the most up-to-date milling plant in the world today and by the use of the new Experimental Mill, need not put a new machine in their main plant



MILLS.—DAILY CAPACITY 40,000 BARRELS.

nor grind a pound of wheat until their experts know just what the new machine and the wheat will do for Gold Medal Flour. In addition, the Laboratory and Testing Room, Chemists, Experimental Bakers, Flour Testers and the entire organization comprising this great company, is working constantly for the high quality of Gold Medal Flour.

The ambition of Washburn-Crosby Co. is that Gold Medal Flour shall hold a customer's trade permanently after the first order. Merit, quality and economy to the purchaser is the policy which forms the foundation of this great business. That it is successful is evidenced by the fact that for years the Washburn-Crosby Co. has been the largest flour manufacturer in the world.

ABOUT BREAD

What a grand thing for a girl to be able to make a perfect batch of bread. She will be happy when she attains that accomplishment and every member of the home in which she lives will also be happier, for what is nicer and more healthful to eat than good, wholesome bread.

In another portion of this book we have told you something of the kernel of wheat and something of Washburn-Crosby's Gold Medal Flour. Now let us show you how you can make the best bread from the best flour.

BREAD MAKING: By using our recipes following this article, and keeping in mind what we say about bread making, you will surely secure good results quickly.

The room where bread is made during the whole process should be kept at an even temperature of 80 degrees Fahr. Have the ingredients at about the same temperature. In cold weather use water enough warmer to bring the mixed dough to 80 degrees. In warmer weather have the water enough cooler to lower the temperature of the mixed dough to 80 degrees. It is always well to assure yourself of the temperature by using a thermometer. Use 80 degrees to 82 degrees Fahr. as the temperature basis of bread making. The mixed dough, after an hour's time, will come to the temperature of the room.

The necessary ingredients in bread making are flour, water, salt and yeast. Sugar hastens fermentation and is a yeast food. Lard or shortening of any kind adds richness and flavor to bread.

Flour should always be sifted before using; this fills the flour particles with air and makes it work easier.

Gluten is that portion of the flour which gives dough its rising properties and distinguishes it from all other cereals.

If you use Gold Medal Flour and the dough rises slowly, either it has been mixed too cool or yeast which is not fresh has been used.

YEAST: There are two general methods of bread making, called the Straight Dough and the Sponge.

In making bread with a sponge, home-made, dry yeast or compressed yeast can be used. In a straight dough compressed yeast only can be used. Compressed yeast should always be fresh when used; it should be brittle and break sharp without bending.

In using dry yeast, it is well to dissolve it in potato water, that is, water in which potatoes have been boiled. Scalded flour, made by making a thin batter with Gold Medal Flour and water and bringing just to a boil while constantly stirring, also gives good results. These furnish a ready prepared food for the yeast and thus hastens fermentation.

Yeast develops best in the dough at a temperature of 75 to 85 degrees. If kept above this temperature ferments become active causing sour bread.

It is better to use too much rather than too little yeast. The yeast is killed during the baking so has no after effects on the bread.

DOUGH: The dough should not be made too stiff. A soft dough is much better. A nice, soft, silky textured dough makes a tender, even grained, creamy colored bread that will keep moist, as long as is necessary.

After mixing, the dough should rise about double its volume, or until when dented with the finger there is very little resistance and the dent will not fill out.

In kneading after the first rising do not knead too much—just enough to free it from most of the gas. Kneading also brings all parts of the dough in contact with the oxygen of the air, which aids the yeast in its growth.

Avoid uneven temperatures and draughts. Keep the dough well protected so as to avoid a crust forming or the dough becoming cold.

STRAIGHT DOUGH: This process is the most modern and scientific method of bread making. Only compressed yeast can be used. This method consists in mixing all the ingredients together, making a dough which is as soft as can be handled conveniently. This is allowed to rise until it has become double its original volume, or when pressed with the finger does not offer any resistance. It is then kneaded down to force out the gas and allowed to rise again to once and a half its size. It is then moulded into loaves, allowed to rise to the top of the pans and baked. The straight dough is the shortest method of bread making and gives the best bread, as it retains the greater part of the wheat flavor.

SPONGE METHOD: A portion of the dough is made first from flour, water and yeast and allowed to ferment and rise, after which the balance of the flour and other ingredients are added. Home-made yeast, dry yeast or compressed yeast can be used in making bread by this process. Many people think a sponge is a necessity in bread making. We, however, have found, that bread made from a straight dough has a far superior flavor to bread made from a long fermented sponge. After the dough is started, the quicker the bread is completed the better. The ferments causing sour bread are avoided in the straight dough.

IMPORTANT ITEMS: Flour, water, yeast and salt, are the necessary ingredients in bread making. However, a little lard is a help. It makes a richer loaf and helps to produce a silky texture.

Sugar helps fermentation. It is a yeast food and makes it work faster. It also gives to the loaf a nice crust of golden brown color.

Salt is always necessary—first, to control the action of the yeast, and finally, for flavor.

The goodness of a loaf of bread as regards color, flavor and texture depends largely on the manner it is handled during fermentation.

MOISTURE: Water used in bread making gives a good loaf, but half water and half milk is better. Use skim milk if you wish. The use of milk enriches the bread, giving it better color, flavor and grain. The dough should be made slightly sticky when mixed because during the fermentation period it stiffens up. Too stiff a dough does not make a well raised loaf.

Milk should always be scalded when used in bread making. When milk is used, however, the dough rises slightly slower. After kneading the dough thoroughly, place it in a large bowl or bread pan and let it remain in a warm place until double in size. Then knead down and allow to rise to one and one-half times its size and form into moderate sized loaves and place them in greased pans. A separate pan for each loaf is the best, as small loaves bake the easiest and are more sure to be thoroughly done. Brush lightly the tops of the loaves with water, milk or melted lard. Prick each loaf eight or ten times with a long needle. This prevents uneven texture. After

allowing the loaves to stand thirty or forty minutes, or until they have about half risen, place in a hot oven. After the first five or ten minutes in the oven turn the pans. After baking, when the bread is cooling, covering is unnecessary.

Flour should be kept in a dry place and never stored near anything having a disagreeable odor. Everything used in bread making should be kept perfectly clean. Frequently wash the bread-box or jar.

One quart of water weighs relatively two pounds. That quantity of moisture will take about three pounds of flour, or about three quarts. This will produce about five pounds of bread.

Bread properly made from Gold Medal Flour makes a large loaf, golden on the outside and of creamy whiteness on the inside. Bread from inferior flours lacks good size and is chalky white or dark in color, therefore not desirable.

There are more digestible, nutritious constituents needful for the body in a loaf of bread made from Gold Medal Flour than can be found in any bread made from whole wheat or graham flour.

RECIPE FOR MAKING BREAD

STRAIGHT DOUGH

In cold weather, set Flour in a warm place for three or four hours before using—as Flour should *never be used cold.* Use only *good fresh compressed yeast,* as much depends on the quality of the Yeast in making Bread. Do not make the *dough too stiff.*

Set your Bread to rise in the morning, and follow these rules closely.

To one (1) quart of lukewarm water (not hot) wetting (composed of equal portions of water and sweet milk, or water alone) add two (2) half ounce cakes (1 oz.) of Compressed yeast, and stir until completely dissolved, then add one (1) teaspoonful of salt and three (3) teaspoonfuls of sugar. When salt and sugar are thoroughly dissolved, stir in well sifted flour with a wooden spoon until a dough is formed sufficiently stiff to be turned from the mixing bowl to the moulding board in a mass. (The quantity of flour used to above wetting should be about three (3) quarts; to this flour may be added with excellent results, about two (2) tablespoonfuls lard, if shortening is desired.) Knead this dough, adding, if necessary, a little flour from time to time until it becomes smooth and elastic and ceases to stick to the fingers or moulding board. Then put it into a well greased earthen bowl, brush lightly with melted butter or drippings, cover with a bread towel or blanket and set to rise in a warm place for two (2) hours, or until light. As soon as light, knead well and again place in an earthen bowl, covering as before, and set for another rising of an hour, or until light. As soon as light, form gently into loaves or rolls, place in greased bread or roll pans, brush with melted butter or drippings, cover again with the towel or blanket, and let stand for 40 minutes to an hour or until level with the top of the pan and then bake.

SPONGE

In making bread from a sponge, home-made yeast, dry yeast or compressed yeast can be used.

Set a sponge about nine o'clock in the evening, using one pint of cool water, about the temperature it will run from the tap. Add one-half of a compressed yeast cake or 1 cake dry yeast or 1 small cup of home made yeast made up to 1 pint with water. Add flour to make a medium batter and set to rise. Do not place where it will become too warm; also be careful not to let it chill. During the night it will rise and drop.

DOUGH

At 6 or 7 o'clock in the morning add 1 pint of luke warm water, 1 teaspoonful of salt, 2 teaspoonfuls of sugar and 2 teaspoonfuls of lard. Work the sponge up fine and add sufficient flour to make a medium dough and knead until smooth. Put in a bowl and cover with a cloth and allow to rise 1½ hours or until double its size. Mould into loaves, put in pans and let rise to the top of the pans. This takes about 40 minutes to one hour. Put in the oven and bake for 40 to 50 minutes.

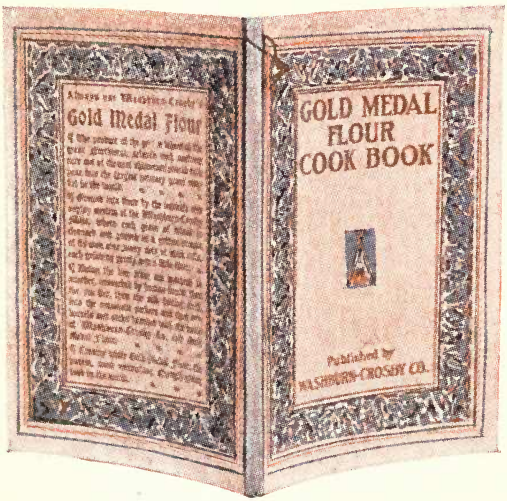
THE GOLD MEDAL COOK BOOK

We have provided a very complete Cook Book for the use of our patrons and others.

The latest edition is now ready and contains 75 pages with a well designed cover, all substantially bound.

Over 1,000 recipes are treated fully, the standard recipes being arranged in the very best manner and with suggestions calculated to bring success. In addition a great many new and novel dishes are described.

Each book is provided with a silk cord in one corner, making it possible to hang the book in a convenient place in the kitchen.



Every package of

GOLD MEDAL FLOUR

contains a coupon which, if sent to us with 10 cents in cash or stamps, will bring the book to you immediately.

SAMPLE CASE

This sample case, illustrating the different stages of wheat as it is manufactured into Gold Medal Flour, together with large charts showing the dissected wheat kernel and a sectional view of simplified flour mill, may be obtained by schools under proper conditions. In connection with this matter kindly write to Washburn-Crosby Co., Minneapolis, Minn., U. S. A.

A VALUABLE LESSON

WE are anxious that the children who read this book remember GOLD MEDAL FLOUR, the name of the brand manufactured by Washburn-Crosby Co. Familiarity with this name will mean much saving and satisfaction in the home which you will have when grown to womanhood and manhood. In order that you may become thoroughly familiar with the three words, GOLD MEDAL FLOUR, will you now endeavor to impress the name firmly in mind by saying out loud, five times, slowly and with careful emphasis, thus: --- "Washburn-Crosby's

GOLD MEDAL FLOUR!
GOLD MEDAL FLOUR!
GOLD MEDAL FLOUR!
GOLD MEDAL FLOUR!
GOLD MEDAL FLOUR!

This is a very good lesson to learn. It means highest quality in baking --- greatest economy, and all round household contentment.

WASHBURN-CROSBY CO.

Eventually
WASHBURN-CROSBY'S
GOLD MEDAL FLOUR
Why Not Now?
EASY TO BAKE

Eventually
WASHBURN-CROSBY'S
GOLD MEDAL FLOUR
Why Not Now?
EASY TO BAKE